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ABSTRACT

This module, one of 25 on vocational education training for careers in environmental health occupations, contains self-instructional materials on obtaining measurements of stationary environmental noise sources. Following guidelines for students and instructors and an introduction that explains what the student will learn are three lessons: (1) identifying and characterizing stationary environmental noise sources, (2) checking the operational readiness of a Type 2 sound level meter and sound level calibrator, and (3) making screening survey and sound level measurements of noise produced by stationary sound sources. Each lesson contains objectives, recommended methods and locations for practice, performance criteria, equipment and supplies to perform a task, detailed step-by-step instructions for learning a task, and performance exercises. Three performance tests cover identifying and characterizing environmental noise sources by land use zone, checking the operational readiness of the SLM and calibrator, and making screening survey sound level measurements. (CT)

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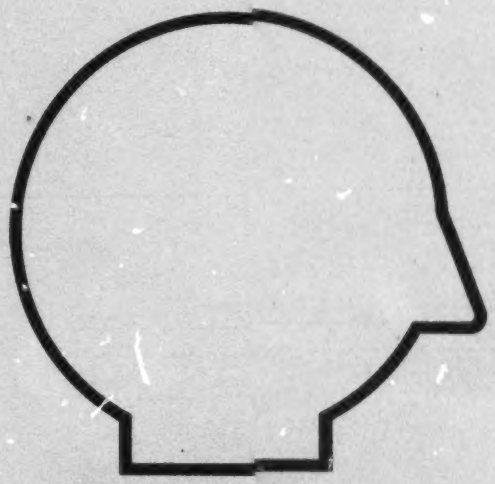

Obtaining Measurements of Stationary Environmental Noise Sources

Module 2

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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FOREWORD

The Curriculum and Instruction Branch of the Office of Vocational and Adult Education, U.S. Department of Education, identified a need to improve the training opportunities for vocational education students interested in pursuing careers in environmental health. To fulfill that need, Consumer Dynamics, Inc., a Rockville, Maryland, based company, was awarded the contract to develop performance-oriented, competency-based modules in the environmental health sciences.

OBTAINING MEASUREMENTS OF STATIONARY ENVIRONMENTAL NOISE SOURCES is one of the modules in the series, "Vocational Education Training in Environmental Health Sciences." The module content is based on selected materials in the environmental health field. The module is intended to supplement existing course materials.

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USING THESE SELF-INSTRUCTION MATERIALS

This self-instruction learning package or module is designed to allow both students and instructors flexibility of use. Although primarily intended for use in existing training programs, the module can be used by anyone interested in learning new skills or perking up old ones. Therefore, two sets of guidelines are presented--one set addressed to students and the other set addressed to instructors. First, find out how you, the student, should use the materials in this book.

GUIDELINES FOR STUDENTS

Take the Performance Test as a pretest.

When you pick up this book and work through it, our goal will not be a letter grade or a high score on an exam. Instead, you will work to develop skills that you can measure. You will not have to worry about how well someone else is doing. Before you start work on this module, you should, first, find out if you have sufficient skills to start training by reading through the section called PERFORMANCE TEST. If you think you can do all or most of the items in this test, ask your instructor to obtain the necessary equipment and supplies. You should have a course in high school physics, or have equivalent training. You should also have learned how to calibrate and use a Type 2 sound level meter.

Work on parts you need to practice.

If you do everything well, according to the criteria in the Performance Test guidelines, you will not need to spend time working on this module. If after taking the Performance Test you discover there are parts you need to practice, follow the key to each item in FOR FURTHER STUDY.

Work straight through each lesson in the order presented.

Should you ducide to completely work through this module, begin with the INTRODUCTION and go straight through each of the three lessons. The lesson begins with the OBJECTIVE of the training. Follow the instruction for each part in the order presented. Practice each step in a lesson until you can do it according to the criteria stated for the step. At the end of a lesson, do the EXERCISES. When there are audiovisuals listed at the end of a lesson, ask your instructor for help in obtaining them.

USING THESE SELF-INSTRUCTION MATERIALS

Take the Performance Test as a posttest.

Finally, after you have mastered all of the exercises in each lesson, ask your instructor to watch you do each item in the Performance Test. The items in the Performance Test are intended for use as a posttest to evaluate the quality of your performance. Turn now to the Performance Test.

GUIDELINES FOR INSTRUCTORS

Approach

The approach of these materials is to provide the student with the opportunity to learn skills for making screening survey measurements of stationary noise sources located in residential, industrial, and commercial land use zones. The equipment you have available may be somewhat different from that presented in the lessons. If such is the case, you may need to write supplementary instructions to point out the equipment differences. The skills tested on the Performance Test are designed for use with any make and model of instrumentation.

Independent Study

Students can work independently and at their own pace. Depending on the time frame you set for completing each lesson, you may want to start a group off in each lesson with a demonstration and informal presentation.

As a Laboratory Workbook

Alternatively, you may choose to use this module as a laboratory workbook in a structured laboratory session. With this option, you may allow students greater access to your assistance, especially in watching them perform the pre- and posttest portions of the training.

General Instructions

Read through each lesson to anticipate what equipment and supplies you will need to make available for students to use. Also, order any audiovisuals or reading materials you think may present a complementary perspective to the training in this module. Use the items in the Performance Test as the minimum requirements for gauging successful completion of the training.

INTRODUCTION

BACKGROUND

Environmental noise is unwanted sound produced by transportation, factories, commercial establishments, and people where they live. Environmental noise affects the general public, whereas occupational noise primarily affects the workers in the workplace. But often noise produced by the machines, ventilation systems, and people in the workplace affects others who live just outside noisy industrial or commercial establishments.

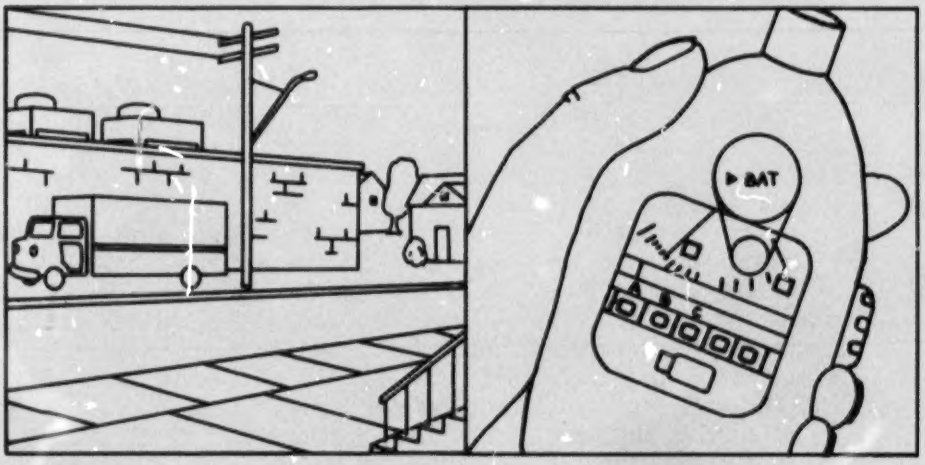
Noise that affects the general public can be divided into two categories of noise sources: those that are stationary or always associated with a particular fixed operation, and those that are nonstationary or mobile. The requirements for measuring sound levels produced by nonstationary noise sources vary more than the requirements for measuring stationary sources. Because of this variability, the focus of this module is on measuring sound levels produced by stationary sources. Many community noise control ordinances set numerical limits for the level of noise that can be generated by sound-emitting sources located in residential, industrial, and commercial land use zones. The reason there are different limits for these zones is that the character of noise produced by sources located in each zone varies greatly with the specific activity. Noise from an industrial zone, for example, is likely to be more intense, to last longer, and to have a greater impact on those living close to a foundry than to those living close to a convenience store. Consequently, most noise ordinances that regulate noise by sound level limits require that sound level measurements be made at the property lines of residences.

Different types of sound level measurement surveys are conducted. To obtain measurements of peak noise levels, a screening survey is performed. The measurement results are used to confirm that noise at a certain level is being produced. To determine what the variations are in the noise levels over a 24-, 48-, or 72-hour period, levels are continuously monitored and recorded for later analysis. To design noise control barriers or devices, wavelength frequency analyses are performed using sophisticated multiband frequency detectors.

You may be required to make screening survey measurements if you are employed by State or local government, or by private industry. The data you collect will be used to determine if a more detailed sound level survey should be conducted.

WHAT YOU WILL LEARN

When you finish working through the steps and exercises in this module, you will be able to determine the level of sound produced by stationary sources located in residential, industrial, and commercial land use zones.



You will learn these procedures in three lessons:

- o Lesson One

  You will be able to identify and characterize stationary environmental noise sources located in residential, industrial, and commercial areas.

- o Lesson Two

  You will be able to check the operational readiness of a Type 2 sound level meter and sound level calibrator.

- o Lesson Three

  You will be able to make screening survey and sound level measurements of noise produced by stationary sound sources.

LESSON ONE

OBJECTIVE

You will be able to identify and characterize stationary environmental noise sources located in residential, industrial, and commercial areas.

WHERE AND HOW TO PRACTICE

Read through the entire lesson. Walk or drive to each of the areas described in the steps. If you have difficulty identifying any of the sound sources, revisit the areas with a friend, classmate, or your instructor. Work through the exercises to help you learn what differences exist between one and another type of noise in an area.

HOW WELL YOU MUST DO

You must be able to describe the difference between stationary and nonstationary noise sources. You must also be able to explain how steady-state, intermittent, and impulse noise sources are different, and be able to name and point out, on site, examples of each in residential, industrial, and commercial land use zones.

THINGS YOU NEED

To work through the steps and exercises in this lesson, you will not need any particular equipment or supplies other than a pencil and notebook for making notes.

Instructions: Now turn to the next page and begin work on Lesson One, "Getting There--Steps."

GETTING THERE--STEPS

STEP 1

In this lesson are described the characteristics of sound emitted from stationary sound sources commonly associated with three categories of land use:

- o residential
- o commercial
- o industrial

Because the purpose of determining the sound level of stationary sources in these areas is to measure sound pressure, characterization of noise GENERATION need only include a discussion of:

- o duration of sound
- o intensity of sound (pressure)
- o frequency of occurrence
- o cause of sound emission

KEY POINT 1

In a sound level screening survey of stationary noise sources, only sound pressure, and not sound, is usually measured.

STEP 2

Noise or unwanted sound becomes a problem in RESIDENTIAL areas mostly in the warm months of the year when windows are open or air conditioners are running. But there are some noises that are always there. Walk outside of where you live. Listen to the noises in your neighborhood. If there is a transformer substation nearby, pay attention to the loudness of the noise it makes. If there is a busy highway close by, can you hear the constant drone of traffic noise, or does the noise fluctuate with the time of day? Walk back into your residence. With the doors and windows shut, do you hear the same noises? With them open, do you hear these noises from your bedroom window?

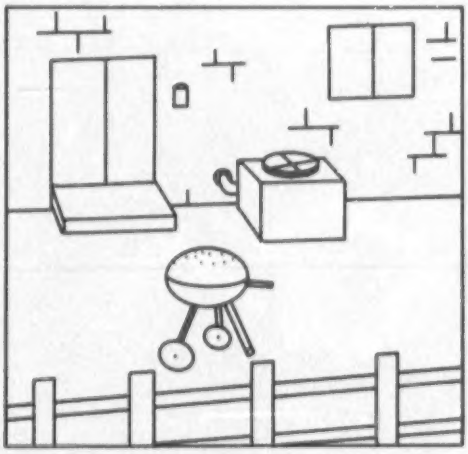
KEY POINT 2

Ask yourself questions about the noises that may be present in your neighborhood on a continuous basis.

STEP 3

Most noise from stationary sources in residential areas is continuous, or lasts for long periods of time. Steady exposure to continuous noise is referred to as STEADY-STATE noise.

KEY POINT 3

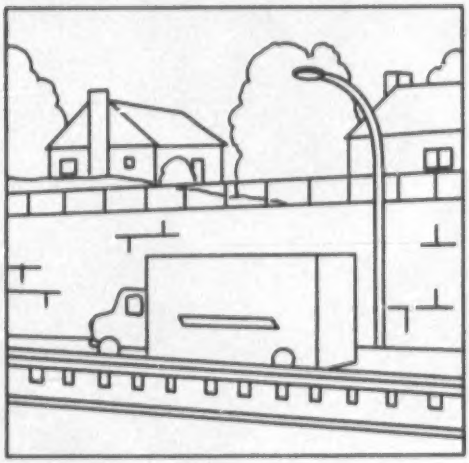


STEADY-STATE noise in residential areas is emitted by air conditioners and transformer substations.

STEP 4

Most people in residential areas are usually not as annoyed with steady-state noise as they are with INTERMITTENT noise from motorcycles, buses, trucks, cars, pets, aircraft, and construction. But these noise sources are mobile, or NONSTATIONARY; therefore, most bothersome residential noise is generated by intermittent, nonstationary noise sources. Characterize the noise sources in your neighborhood.

KEY POINT 4



Bothersome noise in most residential areas is INTERMITTENT from nonstationary sources.

STEP 5

Because sleep disturbance is the leading irritation caused by noise, the focus of stationary noise control ordinance provisions is control of noise affecting residential areas. Violation of daytime or nighttime sound level limits is determined by making sound level measurements at the property line of the residential complainant. Noise from stationary sources usually originates from commercial and industrial land use zones.

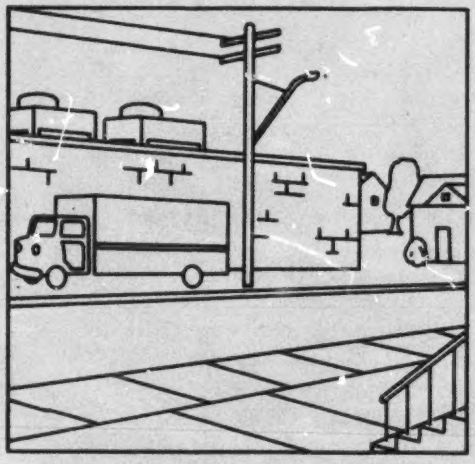
KEY POINT 5

Violations of sound level limits are determined by making measurements at the residential property line.

STEP 6

Noise problems from stationary noise sources located in commercially zoned areas occur frequently because residences are often located very close to fast-food restaurants, gas stations, car washes, retail stores, dairies, and small food-processing plants. Steady-state noise in these establishments is often produced by rooftop refrigeration units and compressors. Intermittent noise can also be generated from stationary operations or sources at the establishment. These include dock-loading operations, refuse collection, outdoor speakers, and parked but running refrigerator trucks. Intermittent nonstationary noise is also generated by vehicular and nonvehicular traffic. Visit a commercial establishment, find a source of stationary noise, and determine how far away the nearest residence is.

KEY POINT 6

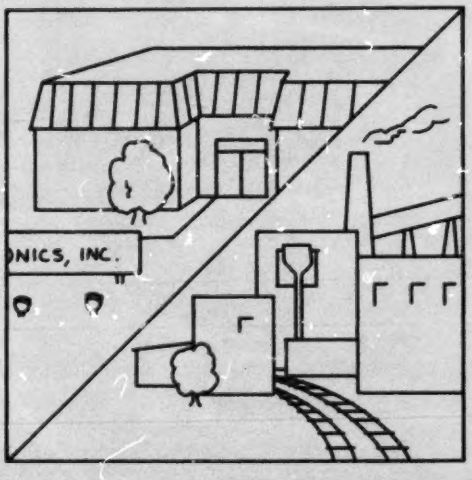


Stationary noise sources at commercial establishments commonly generate both steady-state and intermittent noise.

STEP 7

Industrial zones are often divided into light and heavy industries. Light industries include research and development, manufacture of small parts, and electronics companies. Heavy industry refers to manufacturing that includes foundry operations, metal cutting with large industrial shears, and operations run by dynamos and large diesel generators. Stationary industrial noise sources generate steady-state, intermittent, and IMPULSE noise. Impulse noise refers to high sound pressure levels that occur in a fraction of a second.

KEY POINT 7

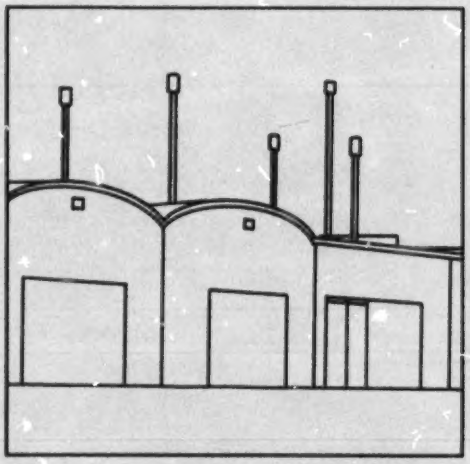


Stationary noise sources located in industrial zones generate steady-state, intermittent, and impulse noise.

STEP 8

The primary source of noise in industrial manufacturing or production facilities is the movement of air in ventilation equipment or escape of high velocity gases through stacks and vents. As long as the plant is operating, this noise is present; therefore, air movement is a source of steady-state noise. Continuously running operations involving milling, grinding, and rock crushing are examples of steady-state noise sources in heavy industry. Intermittent noise is generated by movement of heavy equipment or operations that are frequent but not continuous. Impulse noise is generated by industrial shears and jackhammers. Visit an industrial facility and note what types of noise are generated. Then leave the plant and walk or drive to the nearest residence. What types of noise do you still hear?

KEY POINT 8



Air movement, which is steady-state noise, is the primary source of industrial noise.

EXERCISES

Instructions: The following is a list of noise sources:

1. refrigerator truck
2. conveyor belt
3. diesel engine generator
4. gasoline-engine-powered garden equipment
5. dock-loading operation
6. home heat pump/AC
7. well pump
8. construction cement mixer
9. grinder at food processing plant
10. outdoor intercom
11. jackhammer
12. vacuum transfer operation

For each of the above, describe:

- where you observed the noise source
- whether it was stationary or nonstationary
- what the duration and apparent intensity were (drone, loud enough that it was distracting, so loud you could not hear someone talking to you while standing 3 feet away)
- how often the noise occurred--continuously or intermittently, if it was impulse noise.

Example:

Noise Source	Source Location	Sound Duration	Sound Intensity	Frequency of Occurrence
kitchen exhaust fan--stationary	commercial--Whites' Restaurant	continuous--steady state	drone	on all the time

OTHER READING

U.S. Environmental Protection Agency. Urban Noise Study, 1977.

U.S. Environmental Protection Agency. Model Noise Control Ordinance, 1975.

U.S. Environmental Protection Agency. Noise and Noise Control, 1978.

FILMS AND SLIDE/TAPE PROGRAMS

ABC-TV. "Death Be Not Loud," McGraw-Hill, Hightstown, NJ, 1971.

This 28-minute, color, 16-mm film investigates the insidious aspects of noise. The main focus is on urban noise. This film investigates steps to control the constant increase in noise levels in life today (available from U.S. EPA).

U.S. Department of Commerce, National Bureau of Standards. "The Noise Presentation," 1972.

This is a slide-on-sound demonstration prepared for the President, giving a survey of common noise sources and their sound levels (available from U.S. EPA).

U.S. Department of Commerce, National Bureau of Standards. "Noise Presentation," 1972.

This 12-minute, color, 16-mm film presents various sources of noise pollution that surround us. It shows how the noise levels range from quiet sounds to some that are extremely loud. (Available for $69.50 from the National Audiovisual Center, Washington, DC 20409, Title No. 007075/RL.)

LESSON TWO

OBJECTIVE

You will be able to check the operational readiness of a Type 2 sound level meter and sound level calibrator.

WHERE AND HOW TO PRACTICE

Since you will be taking this equipment into the field, you can check it once before you go and once when you arrive. Read through all of the steps before working with the equipment. If you have any questions concerning the operation of the SLM and calibrator, refer first to the manufacturer's instruction manuals; if you need further assistance, ask your instructor for help.

HOW WELL YOU MUST DO

You must be able, within 10 minutes, to adjust the calibration of the SLM or make the correct decision that the instrument must be returned to the factory for repair or maintenance. You must also decide in the same 10-minute period if the calibrator is functioning correctly, and if it needs to be returned to the factory.

THINGS YOU NEED

To work through the steps and exercises in this lesson, you will need the following equipment and supplies:

- o general-purpose SLM, Type 2, General Radio Model 1565B or equivalent*
- o batteries (2), 9V, Burgess 2U6 or equivalent*
- o sound level generator capable of generating 114 dB at a frequency of 1000 Hz, General Radio Model 1562A or equivalent*
- o replacement battery, 9V, Burgess PM6 or equivalent*

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*Use of these brand names is not intended to be an endorsement by the U.S. Department of Education for any particular product or product line. The equipment shown in this book was selected because it is widely available and commonly used.

THINGS YOU NEED (con't)

- screwdriver, 1/8-inch-wide blade, jewelers
- manufacturer's operating instructions manual.

Instructions: Now turn to the next page and begin work on Lesson Two, "Getting There--Steps."

GETTING THERE--STEPS

STEP 1

Before going into the field to make sound level screening measurements, check the physical and operating condition of the sound level calibrator and sound level meter (SLM).

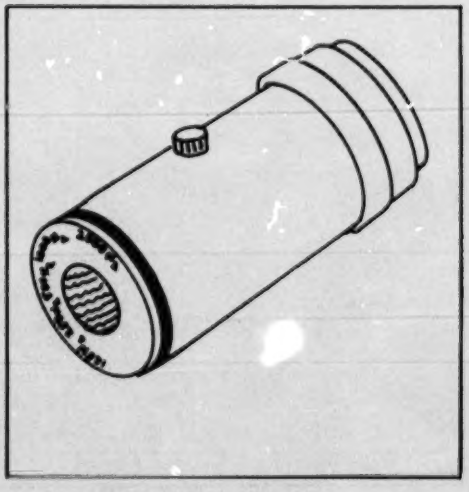
KEY POINT 1

Check the physical and operating condition of the sound level measuring equipment before making measurements.

STEP 2

Check the CALIBRATOR for damage. Depending on the make and model, the instrument's vulnerability to rough handling will vary. For example, the body of the GR-1562A is made of metal, whereas the frequency selector dial is made of plastic. Rarely will there be significant damage to the high-impact case materials, but dents or cracks can indicate the instrument has been dropped. Dropping may result in damage to the shock-sensitive electronic components. Check that the frequency selector dial turns smoothly.

KEY POINT 2

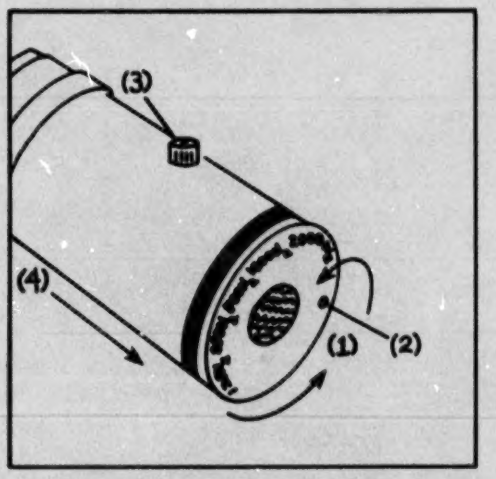


Dents, scratches, or cracks may indicate the instrument was dropped; the dial should move freely.

STEP 3

Before beginning the calibration procedure, check the condition of the calibrator's battery. First, turn the dial counterclockwise (1). If the battery is fully charged, the indicator light (2) will come on. To change the battery, remove the large thumbscrew (3) from the calibrator cover and slip the cover (4) off the end of the instrument. When you install the battery, make sure the contacts are not corroded. When replacing the cover, be careful not to overtighten the thumbscrew.

KEY POINT 3



When the calibrator meter indicator light is on, the battery is in operating condition.

STEP 4

Turn the calibrator on and again check the battery condition. Do not use a battery that gives only a marginal "OK". Hold the dial in this position a few seconds before selecting the test frequency. This procedure prevents damage from occurring to the circuitry. Turn the frequency selector dial to each frequency. If you do not obtain a sound at each point, get another calibrator. Test the intensity output at 1000 Hz by working through step 7.

KEY POINT 4

Allow the calibrator to warm up before checking the sound output.

STEP 5

Check the SLM for damage. As in Step 2, check the case for damage. Check the microphone to be sure none of the holes are blocked with dirt or heavy accumulations of dust. If they are not free of foreign matter, the SLM cannot be used until it is cleaned and factory calibrated. Check that the buttons stay pressed in and that they can be released without sticking.

KEY POINT 5

In addition to checking the case of the SLM for damage, check the meter needle and buttons for free movement.

STEP 6

Check the operating condition of the SLM. Inspect the battery compartment and contacts for corrosion, and insert the battery in the holder while observing the proper polarity. Test the battery condition. Slide the ON-OFF switch to "ON." Press in the battery test button. If the SLM has a needle indicator, make sure it swings across the meter face smoothly without any sudden movements. If the needle rests anywhere in the "Battery OK" zone, the battery condition is adequate.

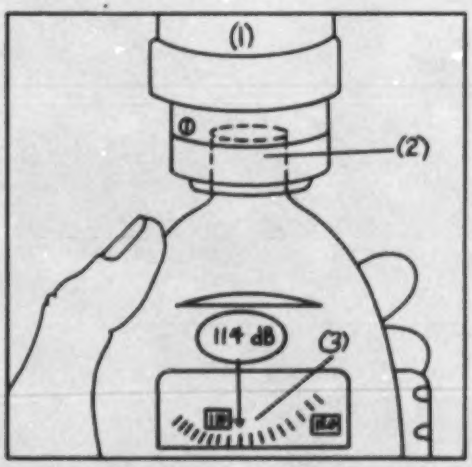
KEY POINT 6

Insert the battery in the SLM; check the needle movement and the battery condition.

STEP 7

To check the electronic circuits, first select the "A" weighting network and the dB range on which 114 dB can be registered. Then, while holding the SLM in a vertical position with one hand, pick up the calibrator (1) and position it over the microphone (2). Slowly push the calibrator onto the microphone as far as it will go. The calibrator will be secure enough to release your grip on it. Turn the calibrator dial counterclockwise all the way to the battery test position before turning the dial to the 1000-Hz setting. Read 114 dB + 1 dB (3) on the SLM meter scale.

KEY POINT 7

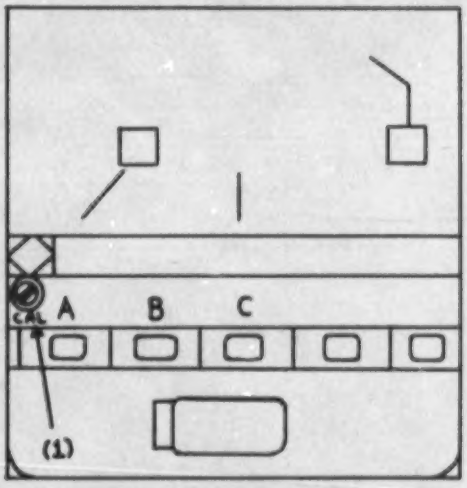


Test the electronic circuits of the SLM by using the calibrator.

STEP 8

If you obtain a reading of 114 dBA at 1000 Hz, test the other frequencies on the calibrator. If you do not obtain 114 dBA ±1 dB, adjust the SLM. Place the jeweler's screwdriver blade into the groove of the "Cal" setscrew (1). Turn it clockwise if the reading needs to be increased or turn it counterclockwise if it is too high. If you cannot make the adjustment, obtain another calibrator that you are sure is working properly. If you still cannot adjust the SLM, change the battery and check it again. Failure again means that the SLM must be repaired and recalibrated at the factory.

KEY POINT 8



Use a small-bladed screwdriver to turn the calibration screws.

STEP 9

If you are not going to use the SLM or the calibrator the rest of the day, remove the batteries from both instruments. Make it a routine practice never to store the SLM or the calibrator with the batteries inside the instruments.

KEY POINT 9

Remove all batteries before even temporary storage of the instruments.

EXERCISES

Instructions: Repeat Lesson Two using at least one other make and model of SLM and calibrator. Other manufacturers include Bruel and Kjaer (B&K) Instruments, duPont, and Quest. Study the manufacturer's operating instructions and work to perform the operational readiness check on other SLM's and calibrators within 10 minutes.

FILMS AND SLIDE/TAPE PROGRAMS

U.S. Air Force. "Operation of Industrial Sound Level Hygiene Survey Equipment," Film No. FTA 272, F and G (no date).

This 16-mm film describes the use of sound level measurement equipment in industry.

LESSON THREE

OBJECTIVE

You will be able to make screening survey sound level measurements produced by stationary sound sources.

WHERE AND HOW TO PRACTICE

After reading all of the steps in this lesson, take your equipment to a residential area adjacent to a commercial or industrial zone. If possible, select a measurement site at which you can have the noise source turned off, or have a noise source, such as a generator or a pump, turned on while you make a set of measurements; have it turned off while you make another set of measurements. Under most conditions, you will not be able to have the noise source quieted. If you practice this lesson on privately owned or restricted property, obtain permission directly or through your instructor to make measurements at the site you have selected.

HOW WELL YOU MUST DO

You must be able to determine total noise, background noise, and noise from the source alone.

THINGS YOU NEED

You will need the equipment and supplies you used in the previous two lessons.

Instructions: Now turn to the next page and begin work on Lesson Three, "Getting There--Steps."

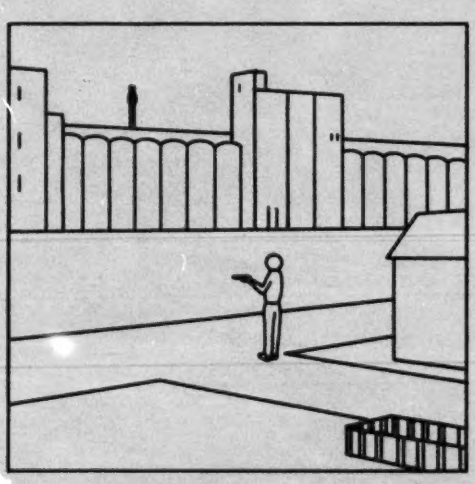
GETTING THERE--STEPS

STEP	KEY POINT
STEP 1 When you first arrive in the field to take sound level measurements, repeat Lesson Two to determine if the operating condition of your equipment has changed.	KEY POINT 1 Determine the operating condition of your equipment.
STEP 2 If you were responding to a noise complaint, you would talk to the complainant before taking any sound level measurements. You would find out where the source of the offending noise is located, whether it is continuous, and at what times of the day it is emitted if it is not continuous. You would contact the individuals responsible for controlling the noise emissions and ask if it is possible to turn off the source of noise. Understandably, it will be difficult, if not impossible, to have an operation shut down while you take sound level measurements. For purposes of this lesson, assume you have performed this step and found that the noise emissions are continuous and cannot be quieted.	KEY POINT 2 Try to get the noise source turned off.

STEP 3

Determine the approximate location at which you will be making sound level measurements. Stand at a point on the complainant's property line closest to the offending noise source.

KEY POINT 3



Select the measurement location.

STEP 4

From the measurement point you have selected, determine the effect that environmental conditions will have on the sound level readings you make. Do <u>not</u> take readings when:

- the relative humidity exceeds 90 percent
- the wind is blowing up more than a breeze.

If in a direct line between you and the noise source there are clusters of trees, clumps of shrubs, or stands of grass so thick you cannot see through them, then you can expect about a 5 dBA loss per 100 feet of plantings. Record your findings.

KEY POINT 4

Note what effect environmental conditions may have on the sound level readings.

STEP 5

Make a note of any large objects or buildings in the vicinity of where you plan to take measurements. Rarely will the effect of reflections ever exceed 3 dBA or even have any effect on outdoor readings. However, if the dimensions of the object are equal to the length of the sound wave, then you might expect to encounter such conditions where there are high-rise apartments or office buildings. To determine what effect such structures will have on your readings, seek help from someone knowledgeable in acoustics.

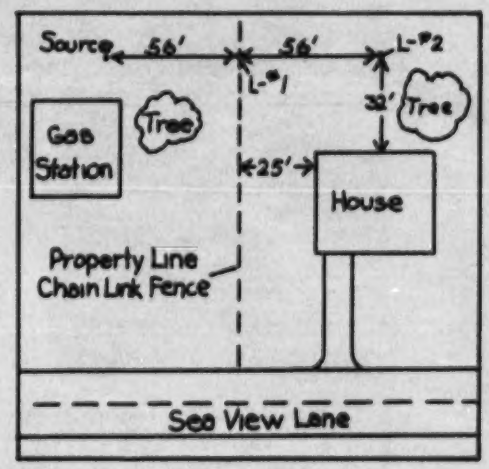
KEY POINT 5

Sound reflections from objects near the measurement site will generally not exceed 3 dBA.

STEP 6

Check the calibration of the SLM, and place a windscreen over the SLM microphone. To determine the BACKGROUND sound level, make a sound level reading at the property line with the source off. When the noise source is turned back on, determine the TOTAL sound level. Record the time, conditions of measurement, and the readings in dBA on a data sheet similar to that supplied at the end of this lesson. If it was not possible to turn off the source, then make a measurement at the property line, L-1. At twice the distance from the source and in a straight line to it, take a reading at L-2, and record all pertinent data on your data sheet.

KEY POINT 6

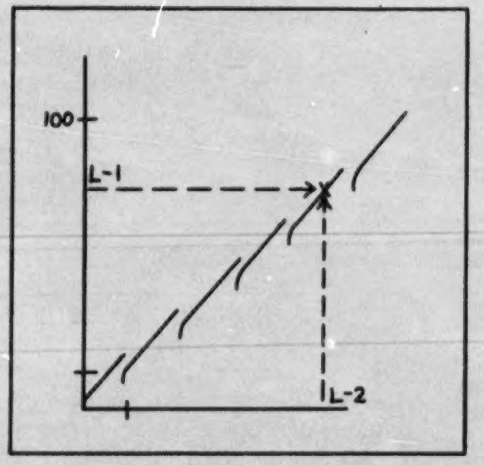


If the source cannot be turned off, take readings at L-1 and L-2.

STEP 7

Use Figure 1 at the end of this lesson to determine BACKGROUND noise levels when the source cannot be turned off. Find L-1 on the y-axis and L-2 on the x-axis. Where the two points intersect, read the background level in dBA.

KEY POINT 7

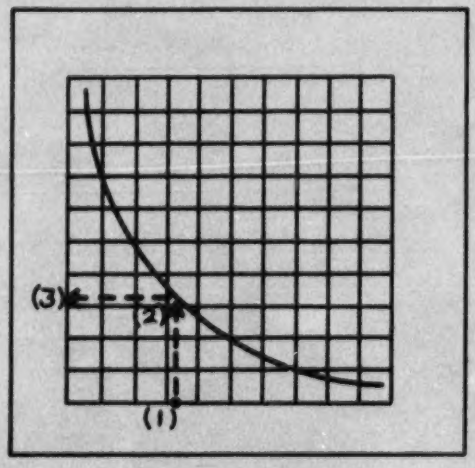


Use Figure 1 to determine the background level when the source cannot be quieted.

STEP 8

If the source cannot be quieted, the measurement at the property line, L-1, represents TOTAL noise. To find the sound level due to the SOURCE alone, first find the differences between the TOTAL level and the BACKGROUND level. Next find this difference (1) on the x-axis of Figure 2 found at the end of this lesson. Read up to the curve (2) and across to the y-axis (3) to determine the correction. Finally, subtract this value from the TOTAL to obtain the sound level of the SOURCE alone.

KEY POINT 8



Use Figure 2 to obtain the correction for the background level; subtract the correction from the total level to find what level is produced by the source.

STEP 9

To determine if the sound level produced by the source is in violation of the noise control ordinance, compare the level with the limits for day and night emissions. Some ordinances allow the level of emissions produced by the source to vary according to what the background level may be at the time measurements are made. When such is the case, determine whether the sound level of the source is a sufficient number of decibels above the background level to be in violation.

KEY POINT 9

Compare the sound level of the source with the sound level limits set by the ordinance.

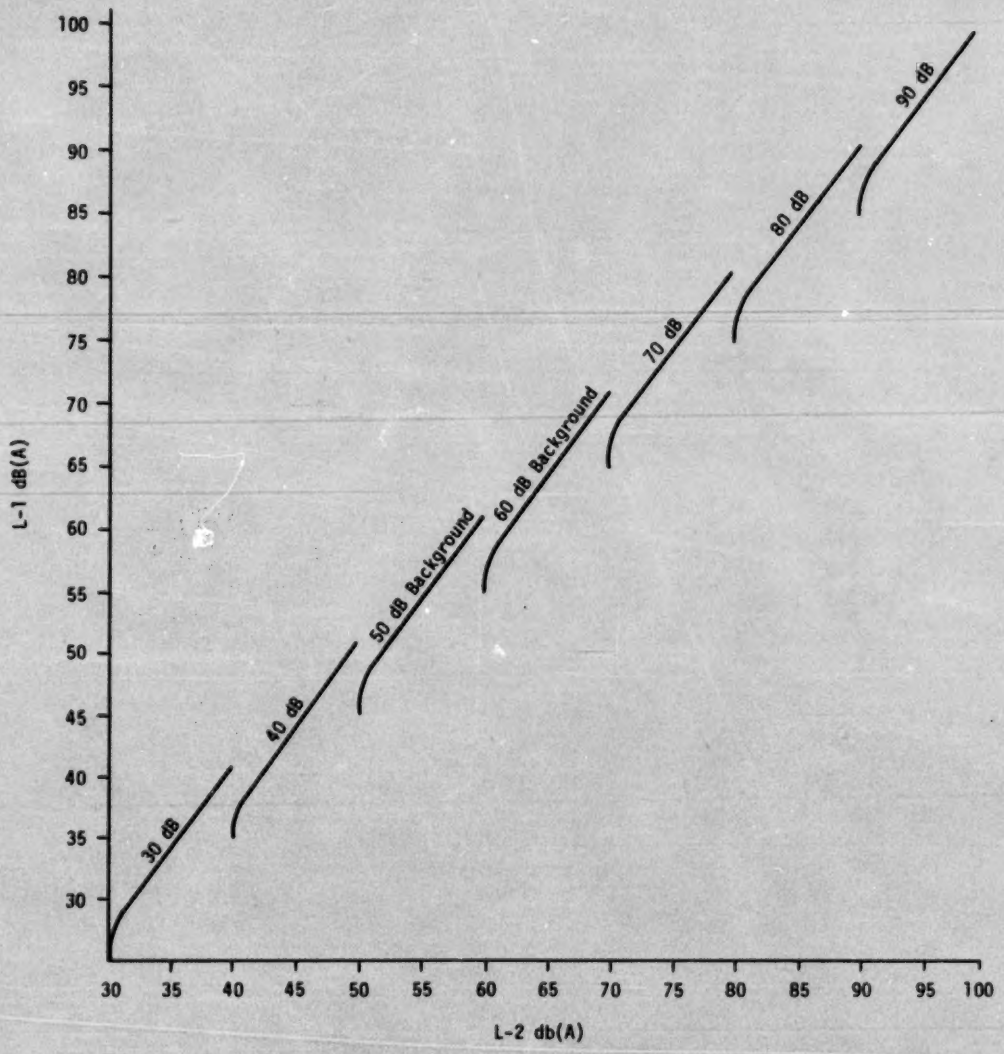


Figure 1. Graph for determining background noise levels from measurements of L-1 and L-2.

(Source: U. of South Florida)

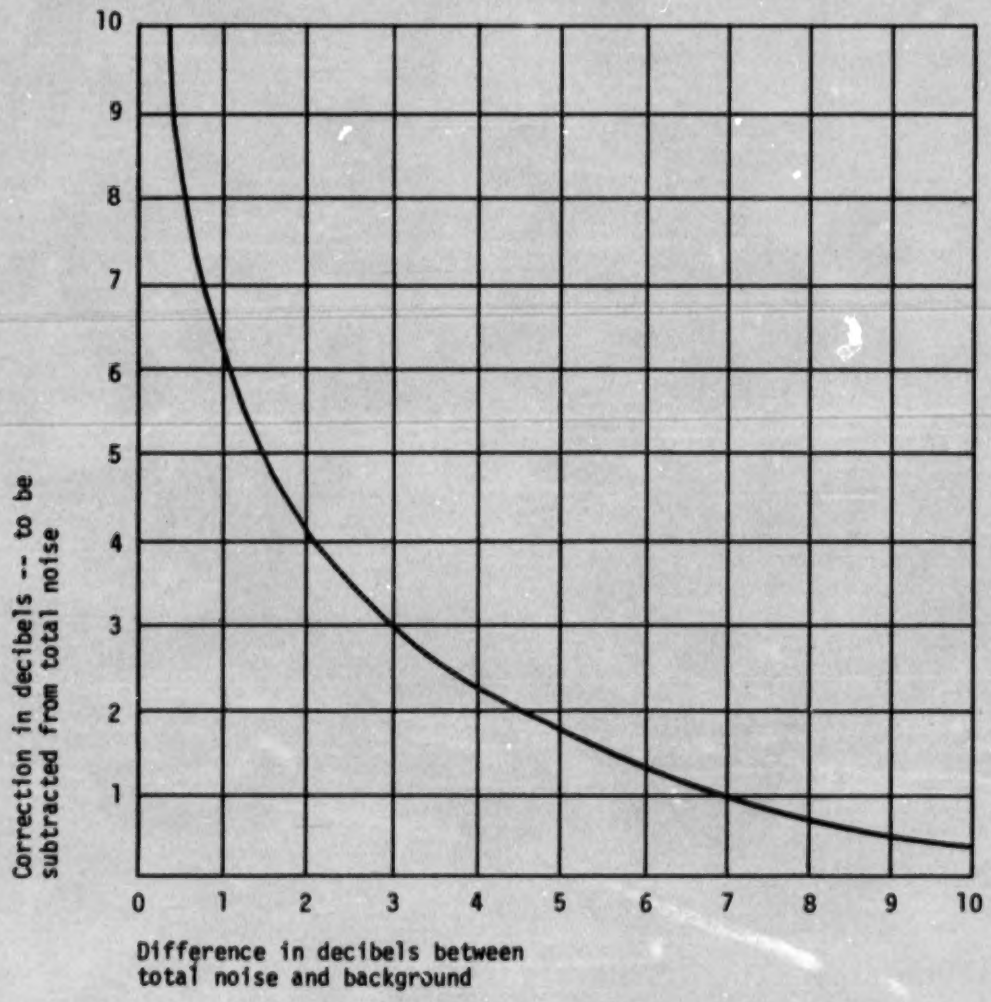


Figure 1. Graph for determining the sound level of the noise source.

(Source: Jack Faucett Associates)

NOISE DATA SHEET

Officer's Name: _____

Officer's I.D.: _____

Date: _____

Location: _____

Area:
- ☐ Residential
- ☐ Commercial
- ☐ Industrial
- ☐ Interior
- ☐ Other _____

Type of Noise:
- ☐ Impulsive
- ☐ Intermittent
- ☐ Steady
- ☐ Motor Vehicle
- ☐ Other _____

Weather:
- ☐ Clear
- ☐ Cloudy
- ☐ Overcast

Other _____

Temperature:
- ☐ Seasonal

Other _____

Wind:
- ☐ Steady
- ☐ Variable

Direction: _____

Speed:
- ☐ Calm
- ☐ Moderate
- ☐ Strong

Recorder Model and Serial No.

Meter Model and Serial No.

Calibrator Model and Serial No.

Meter Response: ☐ Fast ☐ Slow
Wind Screen: ☐ Yes ☐ No

Battery Checked ☐ Yes ☐ No
Meter Calibrated ☐ Yes ☐ No

Noise Source:

Reading Number	Time	dB(A)	Comments*
1 (ambient)			
2			
3			
4			
5			
6			
7			
8 (ambient)			

TEST SITE SKETCH: Indicate noise source location, microphone location, and description of area in such a manner that others could repeat the tests at the same location.

NORTH

*For motor vehicles, indicate year, make, model, and license and citation numbers.

(Source: U. of South Florida)

EXERCISES

Instruction 1: From the property line of a different residence, make another set of sound level measurements of the same noise source you measured in this lesson. Determine total, background, and source sound levels.

Instruction 2: Make sound level measurements from the property line of a residence located near:

- a stone and gravel operation
- a dairy
- a supermarket
- a gas station
- a fast-food restaurant.

Determine total, background, and source sound levels for at least two of these noise sources.

Instruction 3: Repeat Instruction 2 except take sound level readings during the least and most active periods for both day and night operations. Determine the total, background, and source sound levels. Compare these measurements with the sound level limits of the noise control ordinance in the city where you made the measurements. If there is no noise control ordinance, compare the results with the State ordinance or ordinance of a nearby city.

PERFORMANCE TEST

Instructions: Check your skill level or progress by working through each of the items in this test. If you can perform each item as well as required, place a check in the space provided. When all of the items are checked, you are ready to demonstrate your skills to your instructor. You may use the following list if needed. You will be considered trained in a skill after your instructor approves your performance on each of the following items.

IDENTIFYING AND CHARACTERIZING ENVIRONMENTAL NOISE SOURCES BY LAND USE ZONE

No. 1 ____ Point out two predominant stationary noise sources in a RESIDENTIAL zone; describe the duration and intensity of each source, and determine the frequency of its occurrence.

No. 2 ____ Point out two predominant stationary noise sources in a COMMERCIAL zone; describe the duration and intensity of each source, and determine the frequency of its occurrence.

No. 3 ____ Point out two predominant stationary noise sources in an INDUSTRIAL zone; describe the duration and intensity of each source, and determine the frequency of its occurrence.

FOR FURTHER STUDY

If you could not perform one or more of the three items above, review and practice the following lesson steps:

No. 1
Lesson One, Steps 1 through 4

No. 2
Lesson One, Steps 1, 3, 4, and 6

No. 3
Lesson One, Steps 1, 3, 4, 7, and 8

CHECKING THE OPERATIONAL READINESS OF THE SLM AND CALIBRATOR

No. 1 ____ Check the SLM and calibrator for signs of damage, including meter swing and switching movements.

PERFORMANCE TEST

No. 2 _____ Check and replace the batteries in the SLM.

No. 3 _____ Select the appropriate decibel range for calibrating the SLM

No. 4 _____ Adjust the weighting network response of the SLM for calibration.

No. 5 _____ Check and replace the battery in the sound level calibrator.

No. 6 _____ Turn the frequency selector dial of the multifrequency calibrator to the calibrating frequency in a way that will prevent damage to the circuitry.

No. 7 _____ Adjust the SLM meter needle so that it reads exactly 114 dB when calibrated.

FOR FURTHER STUDY

If you could not perform one or more of the seven items above, review and practice the following lesson steps:

No. 1
Lesson Two, Steps 2, 5, and 6

No. 2
Lesson Two, Step 6

No. 3
Lesson Two, Step 7

No. 4
Lesson Two, Step 7

No. 5
Lesson Two, Steps 3 and 4

No. 6
Lesson Two, Step 4

No. 7
Lesson Two, Steps 7 and 8

MAKING SCREENING SURVEY SOUND LEVEL MEASUREMENTS OF STATIONARY SOUND SOURCES

No. 1 _____ Determine whether the offending noise source emits continuously or intermittently, or whether it emits impulse noise.

No. 2 _____ Select a point on the complainant's property line that is closest to the noise source.

No. 3 _____ Determine whether environmental conditions are suitable for taking sound level readings.

No. 4 _____ Determine the total sound level when the source cannot be quieted.

No. 5 _____ Determine the background sound level when the source cannot be quieted.

No. 6 _____ Determine the sound level due to the source alone.

No. 7 _____ Compare total, background, and source sound level measurements with numerical sound level limits included in a community noise control ordinance.

FOR FURTHER STUDY

If you could not perform one or more of the seven items above, review and practice the following lesson steps:

No. 1
Lesson Three, Step 2

No. 2
Lesson Three, Step 3

No. 3
Lesson Three, Steps 4 and 5

No. 4
Lesson Three, Step 6

No. 5
Lesson Three, Step 7

PERFORMANCE TEST

No. 6
Lesson Three, Step 8

No. 7
Lesson Three, Step 9

REFERENCES

Jack Faucett Associates. Class Notes for a Workshop on Noise Control and the Planning Process, January 24-25, 1979.

University of South Florida. A Training Manual For Noise Enforcement Teams, William A. Smith (Editor), College of Engineering, Tampa, FL, July 1974.